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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/209,634 12/10/98 LEU

F UPA-98165

JASON Z LIN
19597 VIA MONTE DRIVE
SARATOGA CA 95070

MMC2/0503

EXAMINER

THAI, L

ART UNIT

PAPER NUMBER

2811

DATE MAILED:

05/03/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.
09/209,634

Applicant(s)
Leu et al.

Examiner
Luan Thai

Group Art Unit
2811



☐ Responsive to communication(s) filed on _____.

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 1-20 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-16 is/are rejected.

☒ Claim(s) 17-20 is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been
☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____.

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☒ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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DETAILED ACTION

Drawings

1. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

Claims 1-2, 5-6, 8, 10-12, and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Barrow (5,917,702) and/or Guzik et al. (5,153,379).

With respect to claims 1-2, 5, 8, 11-12, and 14, Barrow discloses (see figures 1-3) (and/or Guzik et al.'s figures 1-4) a semiconductor chip package comprising: a ball grid array substrate panel 12 having top and bottom surfaces (14-16); a plurality of solder balls 46 attached on the bottom surface; a chip 34 being mounted substantially in the center of the top surface of the substrate; a plurality of contact pads (and/or supporting structure) 18 bonded on the top surface of the substrate, each of the pads being located near a corner of the chip; a metal heat slug 40 (Col. 2, lines 7+) having a top plate covering the chip and a plurality of flanges (from four sides of the heat slug) extending down to the substrate; the top plate being bonded to the chip by means of

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a first thermally conductive 44 (col. 2, lines 56+), and the heat slug being connected to the contact pads 18 by means of a second adhesive material 42.

With respect to claim 6, Barrow (and/or Guzik et al.) further discloses the heat slug comprising a plurality of contact bodies (e.g., four portions at four corners of the heat slug) bonded the heat slug to the substrate at the contact pads 18 formed on four corners of the substrate.

For the similar reasons previously stated in claims 2 and 5, claims 8 and 10 are respectively anticipated by Barrow (and/or Guzik et al.).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3-4, 7, 9, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barrow (5,917,702) and/or Guzik et al. (5,153,379).

With respect to claim 3, although Barrow (and/or Guzik et al.) does not specifically disclose the claimed of providing electrical shielding effect of the heat slug, this feature could be obvious included in Barrow's device (and/or Guzik et al.) since a means for enclosing the chip

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(Col. 2, lines 9+) and electrically connected to the substrate (Col. 2, lines 28+) of the metal heat slug are disclosed. In fact, Applicant's claimed structures in claim 3, do not distinguish over the Barrow (and/or Guzik et al.) reference and it has been held that a recitation (e.g., for providing electrical shielding effect) with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex Parte Masham*, 2 USPQ F.2d 1647 (1987).

With respect to claim 4, Barrow (and/or Guzik et al.) further discloses the second adhesive material 42 being electrically conductive (Col. 2, lines 53+).

With respect to claim 7, Barrow (and/or Guzik et al.) discloses all the limitations of the claimed invention as detailed above (including the contact bodies being formed near a corner of the top plate and having a flat bottom) except for the claimed hollow interior of the contact bodies. Although Barrow (and/or Guzik et al.) does not specifically disclose the claimed hollow interior, the bend down portions at four corners of the heat slug in Barrow's device structure could be considered as the claimed hollow interior; therefore, the contact bodies at four corners of the heat slug in Barrow's device would have been obvious to comprise the hollow interior.

For the similar reasons stated in claim 3 above, claims 9 and 13 are unpatentable over Barrow.

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4. Claims **15-16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Barrow (5,917,702) and/or Guzik et al. (5,153,379) in view of Wang et al. (5,977,626).

With respect to claim **15**, Barrow (and/or Guzik et al.) discloses all the limitations of the claimed invention as detailed above with the exception of the claimed rectangular shape and central opening of the supporting structure.

Wang et al. while relates to a similar structure design teaches (see figures 2-6, specifically see figure 6) the supporting structure (and/or bonding pads) 20a having a central opening for fully exposed the top surface of the chip 22 and a rectangular shape in order to make ground connection between four supporting structures (and/or bonding pads) 20a formed at four corners of the substrate 20. It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply Wang et al's teachings into Barrow (and/or Guzik et al.) device in order to ground connection between four supporting structures (and/or bonding pads) 18.

With respect to claim **16**, Barrow further disclose supporting stubs 24 each being located near a corner of the supporting structures 18.

5. Claims **1-16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al. (5,977,626) in view of Barrow (5,917,702).

With respect to claims **1-2, 5, 8, 10-12, and 14**, Wang et al. discloses (see figures 2-6) a semiconductor chip package comprising: a ball grid array substrate panel 20 having top and bottom surfaces; a plurality of solder balls 28 attached on the bottom surface; a chip 22 being

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mounted substantially in the center of the top surface of the substrate; a plurality of contact pads (and/or supporting structure) 20a bonded on the top surface of the substrate (see figures 4 and 6), each of the pads being located near a corner of the chip; a metal heat slug 32 having a top plate covering the chip and a plurality of flanges A (see figure 4) extending down to the substrate; and the heat slug being connected to the contact pads 18 by means of a electrical conductive adhesive material 34 (Col. 4, lines 1+). Wang et al. does not disclose a thermal conductive adhesive material bonded the heat slug to the chip.

Barrow while relates to a similar structure design teaches (see figures 1-3) the heat slug 40 bonded to the chip 34 by a thermal conductive adhesive material 44 for the heat generated by the chip 34 flowing into the heat slug 40 (Col. 2, lines 56+). It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply a thermal conductive adhesive material as taught by Barrow into Wang et al.'s structure to improve the heat dissipating.

With respect to claims 3-4, 9 and 13, Wang et al. further discloses the heat slug being electrically connected to the substrate for providing electrical shielding effect (Col. 4, lines 29+) and the adhesive material bonded the heat slug to the contact pads 20a is electrically conductive (Col. 4, lines 1+).

With respect to claim 6, Wang et al. further discloses a plurality of contact bodies 32d (see figure 5) bonding the heat slug to the contact pads formed on the substrate.

With respect to claim 7, the proposed device of Wang et al. and Barrow discloses all the limitations of the claimed invention as detailed above (including the contact bodies being formed

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near a corner of the top plate and having a flat bottom) except for the claimed hollow interior of the contact bodies. Although the device does not specifically disclose the claimed hollow interior, the bend down portions at four corners of the heat slug (Wang's device structure) could be considered as the claimed hollow interior; therefore, the contact bodies at four corners of the heat slug in Wang et al. device would have been obvious to comprise the hollow interior.

With respect to claims **15-16**, Wang et al. further discloses the supporting structure 20a having a rectangular shape and a central opening for fully exposing the top surface of the chip (see figure 6, wherein the supporting structure has supporting stubs B (see figure 6) each being located near a corner of the supporting structure.

Allowable Subject Matter

6. Claims **17-20** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Reasons For Allowance

7. The following is an examiner's statement of reasons for allowance:

The cited art fails to teach or render obvious the top plate of the heat slug further having at least two contact bodies each having an opening, and the supporting stubs being snapped in the openings of the contact bodies for fixing the heat slug to the substrate panel.

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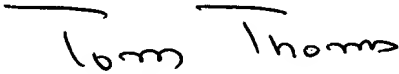
8. Papers related to this application may be submitted to Technology center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center located in Crystal Plaza 4, room 4-C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Group 2811 Fax Center number is (703) 308-7722 and 308-7724. The Group 2811 Fax Center is to be used only for papers related to Group 2811 applications.

9. Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to **Luan Thai** whose telephone number is (703) 308-1211. The Examiner is in the Office generally between the hours of 7:30 AM to 4:00 PM (Eastern Standard Time) Monday through Friday.

Any inquiry of a general nature or relating to the status of this application should be directed to the **Technology Center Receptionists** whose telephone number is (703) 308-0956.

5/02/2000

Luan Thai


Tom Thomas
Supervisory Patent Examiner
Technology Center 2800